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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/603,593	06/25/2003	Yogesh Swami	NOKM.046PA	4865

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EXAMINER	
JONES, PRENELL P	
ART UNIT	**PAPER NUMBER**
2667	

DATE MAILED: 11/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/603,593	SWAMI, YOGESH
	Examiner	Art Unit
	Prenell P Jones	2667

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 June 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) *20-33* is/are allowed.

6)☒ Claim(s) *1-6, 8-10, 12-14, 16-19* is/are rejected.

7)☐ Claim(s) *7,11 and 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/25/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Objections

1. Claim 14 is objected to because of the following informalities: Applicant is claiming on line 1, "***normal*** communication", wherein Examiner questions what is Applicant claiming as being normal communications. Appropriate correction is required.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4, 9, 13, 14, 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramakrishnan in view of Balakrishnan et al and Ding et al

Regarding claims 1, 2, 4, 13, 14, 16, 17 and 19, Ramakrishnan discloses (Abstract, col. 3, line 23-63) a communication system whereby the receiver distinguishes between packets received with non-congestion bit errors and packets having been not received due to congestion, thereby the receiver sends selective acknowledgments indicating packets received with bit errors, (col. 2, line 19-26) recovery schemes used upon detection of congestion error include slow-start, fast recovery, fast-retransmit, (col. 7, line 47 thru col. 8, line 35) flag bit included in SACK that identifies packers received with bit errors (non-congestion) and packets received free of bit errors but not received due to congestion, (col. 10, line 17-32) congestion can be controlled at

the receiver rather than the sender, congestion mechanism (first loss recovery) is invoked when packet loss is due to congestion, (col. 8, line 9 thru col. 9, line 42), second loss recovery is to improve TCP performance as associated with non-congestion bit error to recover loss data. Ramakrishnan is silent on sending a loss notification signal. In analogous art, Balakrishnan discloses a communication system that compares mechanisms for improving throughput as associated with TCP performance over wireless links, throughput and goodput are used as a measurement to compare mechanisms, wherein selective acknowledgments and explicit loss notifications (ELN) display performance improvements, architecture includes a TCP sender using acknowledgments to determine whether packets have reached the receiver, (page 757, col. 2, line 28-33, page 761, col. 1) losses are due to errors not congestion, (page 763, col. 2, line 5-14, line 29 thru page 765, col. 1, line 10, page 768, col. 1, line 1-28) implementing ELN in an end-to-end environment, selective acknowledgments and explicit loss notification results in significant performance improvements which improved end-to-end throughput, ELN is implemented at the receiver, corruption of packets indicated by error (non-congestion) and detected at receiver (network node), receiver sends ELN message with duplicate acknowledgments for lost packets, base station generates ELN message to sender when it observes duplicate TCP acknowledgments arriving from mobile host (network node), (page 760, col. 1 & 2) ELN is added to TCP acknowledgment to mark/identify that non-congestion related loss has occurred, which is received at the sender who may perform a fast retransmission (recovery process) without invoking congestion control procedures, receiver generates ELN information, and Ding discloses transmission of Internet traffic over wireless network (TCP/IP) wherein IP core network is a packet core network which is utilized, TCP receiver sends ACKs ,TCP sender identifies the loss by the arrival of several duplicate ACKs, implementation of slow-start when congestion is detected, (Figs. 5 & 6, page 3485, col. 1-2, page 3486, col. 1 & 2, page

3487, col. 1) TCP with ELN-ACK protocol provides throughput improvement as associated with wireless link bit-error packet loss and wired link congestion packet loss, ELN-ACK algorithm avoids timeout by retransmitting a lost packet immediately by loss recovery mechanism or by fast retransmission, keeps congestion window wide eliminating timeout, ELN-ACK is robust and improves TCP throughput and end-to-end delay in wireless networks, and communication between base station and mobile host (transmitter/receiver). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to be motivated to implement loss notification signal as taught by the combine teachings of Balakrishnan and Ding with the teachings of Ramakrishnan lossy link network for the purpose of further improving end-to-end delay and network throughput.

Regarding claim 3, as indicated above, Balakrishnan discloses a communication system that compares mechanisms for improving throughput as associated with TCP performance over wireless links, throughput and good-put are used as a measurement to compare mechanisms, wherein selective acknowledgments and explicit loss notifications (ELN) display performance improvements, architecture includes a TCP sender using acknowledgments to determine whether packets have reached the receiver, (page 757, col. 2, line 28-33, page 761, col. 1) losses are due to errors not congestion, (page 763, col. 2, line 5-14, line 29 thru page 765, col. 1, line 10, page 768, col. 1, line 1-28) implementing ELN in an end-to-end environment, selective acknowledgments and explicit loss notification results in significant performance improvements which improved end-to-end throughput, ELN is implemented at the receiver, corruption of packets indicated by error (non-congestion) and detected at receiver (network node), receiver sends ELN message with duplicate acknowledgments for lost packets, base station generates ELN message to sender when it observes duplicate TCP acknowledgments

arriving from mobile host (network node), (page 760, col. 1, ELN is added to TCP acknowledgment (ELN is embedded into a signal protocol) to mark/identify that non-congestion related loss has occurred, which is received at the sender who may perform a fast retransmission (recovery process) without invoking congestion control procedures, receiver generates ELN information.

Regarding claims 4 and 9, Ding discloses transmission of Internet traffic over wireless network (TCP/IP) wherein IP core network (network layer) is a packet core network which is utilized, TCP receiver sends ACKs ,TCP sender identifies the loss by the arrival of several duplicate ACKs, implementation of slow-start when congestion is detected, (Figs. 5 & 6, page 3485, col. 1-2, page 3486, col. 1 & 2, page 3487, col. 1) TCP with ELN-ACK protocol provides throughput improvement as associated with wireless link bit-error packet loss and wired link congestion packet loss, ELN-ACK algorithm avoids timeout by retransmitting a lost packet immediately by loss recovery mechanism or by fast retransmission, keeps congestion window wide eliminating timeout, ELN-ACK is robust and improves TCP throughput and end-to-end delay in wireless networks, and communication between base station and mobile host (transmitter/receiver). In addition, messages are sent via IP (network layer) as associated with base station and mobile node communicating data.

Regarding claim 18, as indicated above, Balakrishnan discloses a communication system that compares mechanisms for improving throughput as associated with TCP performance over wireless links, throughput and goodput are used as a measurement to compare mechanisms, wherein selective acknowledgments and explicit loss notifications (ELN) display performance improvements, architecture includes a TCP sender using acknowledgments to determine

whether packets have reached the receiver, (page 757, col. 2, line 28-33, page 761, col. 1) losses are due to errors not congestion, (page 763, col. 2, line 5-14, line 29 thru page 765, col. 1, line 10, page 768, col. 1, line 1-28) implementing ELN in an end-to-end environment, selective acknowledgments and explicit loss notification results in significant performance improvements which improved end-to-end throughput, ELN is implemented at the receiver, corruption of packets indicated by error (non-congestion) and detected at receiver (network node), receiver sends ELN message with duplicate acknowledgments for lost packets, base station generates ELN message to sender when it observes duplicate TCP acknowledgments arriving from mobile host (network node), (page 760, col. 1, ELN is added to TCP acknowledgment (ELN is embedded into a signal protocol) to mark/identify that non-congestion related loss has occurred, which is received at the sender who may perform a fast retransmission (recovery process) without invoking congestion control procedures, receiver generates ELN information. Balakrishnan further discloses (page 761, col. 1, line 5-14) the receiving entity on the lossy link generates an exponential distribution for bit-error rate, and changes the TCP checksum of the packet if there is a determination to drop packets.

3. Claims 5, 6, 8, 10 and 12, are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramakrishnan in view of Balakrishnan et al and Ding et al as applied to claims 1-4 above, and further in view of Chao et al.

Regarding claims 5, 8, 10 and 12, as indicated above, Ramakrishnan discloses (Abstract, col. 3, line 23-63) a communication system whereby the receiver distinguishes between packets received with non-congestion bit errors and packets having been not received due to congestion, thereby the receiver sends selective acknowledgments indicating packets received

with bit errors, (col. 2, line 19-26) recovery schemes used upon detection of congestion error include slow-start, fast recovery, fast-retransmit, (col. 7, line 47 thru col. 8, line 35) flag bit included in SACK that identifies packers received with bit errors (non-congestion) and packets received free of bit errors but not received due to congestion, (col. 10, line 17-32) congestion can be controlled at the receiver rather than the sender, congestion mechanism (first loss recovery) is invoked when packet loss is due to congestion, (col. 8, line 9 thru col. 9, line 42), second loss recovery is to improve TCP performance as associated with non-congestion bit error to recover loss data, Balakrishnan discloses a communication system that compares mechanisms for improving throughput as associated with TCP performance over wireless links, throughput and good-put are used as a measurement to compare mechanisms, wherein selective acknowledgments and explicit loss notifications (ELN) display performance improvements, architecture includes a TCP sender using acknowledgments to determine whether packets have reached the receiver, (page 757, col. 2, line 28-33, page 761, col. 1) losses are due to errors not congestion, (page 763, col. 2, line 5-14, line 29 thru page 765, col. 1, line 10, page 768, col. 1, line 1-28) implementing ELN in an end-to-end environment, selective acknowledgments and explicit loss notification results in significant performance improvements which improved end-to-end throughput, ELN is implemented at the receiver, corruption of packets indicated by error (non-congestion) and detected at receiver (network node), receiver sends ELN message with duplicate acknowledgments for lost packets, base station generates ELN message to sender when it observes duplicate TCP acknowledgments arriving from mobile host (network node), (page 760, col. 1 & 2) ELN is added to TCP acknowledgment to mark/identify that non-congestion related loss has occurred, which is received at the sender who may perform a fast retransmission (recovery process) without invoking congestion control procedures, receiver generates ELN information, and Ding

discloses transmission of Internet traffic over wireless network (TCP/IP) wherein IP core network is a packet core network which is utilized, TCP receiver sends ACKs ,TCP sender identifies the loss by the arrival of several duplicate ACKs, implementation of slow-start when congestion is detected, (Figs. 5 & 6, page 3485, col. 1-2, page 3486, col. 1 & 2, page 3487, col. 1) TCP with ELN-ACK protocol provides throughput improvement as associated with wireless link bit-error packet loss and wired link congestion packet loss, ELN-ACK algorithm avoids timeout by retransmitting a lost packet immediately by loss recovery mechanism or by fast retransmission, keeps congestion window wide eliminating timeout, ELN-ACK is robust and improves TCP throughput and end-to-end delay in wireless networks, and communication between base station and mobile host (transmitter/receiver). However, Ramakrishnan, Balakrishnan and Ding are silent on identifying a transport protocol in a next field. In analogous art, Chao discloses (Fig. 3a and 3b, col. 4, line 12-27) monitoring congestion associated in an ATM system which includes TCP/IP transmission, transport protocol frame, wherein the architecture further includes eight (8) bit next header field which is used to indicate whether another header is present and if so, to identify it and which associated with source and destination address fields in a congestion control system, and a protocol field. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to be motivated to implement identifying transport protocols in a next header as taught by Chao with the combined teachings of Ramakrishnan, Balakrishnan and Ding who also monitor/manage packet congestion as associated with processing data for the purpose of further managing the processing of information as associated in a packet based system.

Regarding claim 6, as indicated above, Balakrishnan discloses a communication system that compares mechanisms for improving throughput as associated with TCP performance over

wireless links, throughput and good-put are used as a measurement to compare mechanisms, wherein selective acknowledgments and explicit loss notifications (ELN) display performance improvements, architecture includes a TCP sender using acknowledgments to determine whether packets have reached the receiver, (page 757, col. 2, line 28-33, page 761, col. 1) losses are due to errors not congestion, (page 763, col. 2, line 5-14, line 29 thru page 765, col. 1, line 10, page 768, col. 1, line 1-28) implementing ELN in an end-to-end environment, selective acknowledgments and explicit loss notification results in significant performance improvements which improved end-to-end throughput, ELN is implemented at the receiver, corruption of packets indicated by error (non-congestion) and detected at receiver (network node), receiver sends ELN message with duplicate acknowledgments for lost packets, base station generates ELN message to sender when it observes duplicate TCP acknowledgments arriving from mobile host (network node), (page 760, col. 1, ELN is added to TCP acknowledgment to mark/identify that non-congestion related loss has occurred, which is received at the sender who may perform a fast retransmission (recovery process) without invoking congestion control procedures, receiver generates ELN information. Balakrishnan further discloses (page 767, col. 1 thru page 768, col. 2) use selective acknowledgment (predetermined number of ack/dupack) as associated with ELN.

Allowable Subject Matter

4. Claims 20-33 are allowed over prior art.

5. Claims 7, 11, 15 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter: Although the combined cited prior art discloses a communication system whereby the receiver distinguishes between packets received with non-congestion bit errors and packets having been not received due to congestion, thereby the receiver sends selective acknowledgments indicating packets received with bit errors, recovery schemes used upon detection of congestion error include slow-start, fast recovery, fast-retransmit, congestion can be controlled at the receiver rather than the sender, congestion mechanism is invoked when packet loss is due to congestion, second loss recovery is to improve TCP performance as associated with non-congestion bit error to recover loss data, selective acknowledgments and explicit loss notifications (ELN) display performance improvements, architecture includes a TCP sender using acknowledgments to determine whether packets have reached the receiver, losses are due to errors not congestion, implementing ELN in an end-to-end environment, selective acknowledgments and explicit loss notification results in significant performance improvements which improved end-to-end throughput, ELN is implemented at the receiver, corruption of packets indicated by error, receiver sends ELN message with duplicate acknowledgments for lost packets, base station generates ELN message to sender when it observes duplicate TCP acknowledgments arriving from mobile host (network node), ELN is added to TCP acknowledgment to mark/identify that non-congestion related loss has occurred, which is received at the sender who may perform a fast retransmission without invoking congestion control procedures, receiver generates ELN information, and Ding discloses transmission of Internet traffic over wireless network (TCP/IP) wherein IP core network is a packet core network which is utilized, TCP receiver sends ACKs ,TCP sender identifies the loss by the arrival of several duplicate ACKs, implementation of slow-start when congestion is detected, TCP with ELN-ACK protocol provides throughput improvement as associated with wireless link bit-error

packet loss and wired link congestion packet loss, ELN-ACK algorithm avoids timeout by retransmitting a lost packet immediately by loss recovery mechanism or by fast retransmission, keeps congestion window wide eliminating timeout, ELN-ACK is robust and improves TCP throughput and end-to-end delay in wireless networks, and communication between base station and mobile host (transmitter/receiver), architecture further includes eight (8) bit next header field which is used to indicate whether another header is present and if so, to identify it and which associated with source and destination address fields in a congestion control system, and a protocol field they fail to teach or suggest a packet marking module coupled to receive PLB indications and to mark the respective previously-transmitted packets as potentially subject to PLB, and a verification module coupled to receive a packet loss indication corresponds to any of the previously-transmitted packets that have been marked, and a packet marking module coupled to receive at least a portion of the loss notification signal and to mark the packet as potentially subject to non-congestion based packet loss, and copying as many bytes from the non-congestion packet loss as can fit in the signal protocol packet in the network layer packet, setting a slow start threshold equal to a number of packets in flight until packet loss is acknowledged, dropping the signaling protocol packet if transport layer protocol in next header field is not among predetermined group of transport layer protocols, and incrementing a congestion window for each duplicate acknowledge received.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prenell P. Jones whose telephone number is 571-272-3180. The examiner can normally be reached on 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on 571-272-3179. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Prenell P. Jones *Prenell Jones*

November 15, 2004